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tion opposite to that of the sun, was estimated from the observations made two days preceding, when it measured about  $9' 40''$ , and its length, consequently, 659,000 miles.

Dr. Herschel remarks, that the physical construction of this comet must have been extremely different from that of the former, approaching very nearly to the planetary condition, and having a diameter nearly one third that of the earth.

The light by which it was seen he also considers as planetary; that is to say, reflected from the sun, and not phosphorescent, like the preceding; for if this were self-luminous, says Dr. Herschel, we could hardly account for its little density, which would scarcely bear to be magnified even to 107 times, although the former was seen with a power of 600 even better than with one that was lower.

The chevelure, however, he conceives to consist of phosphoric matter suspended in an elastic atmosphere that surrounds the body of the comet; and he ascribes the faint appearance of this chevelure, according to the theory advanced in his late communication, to the existence of a very small quantity of nebulous matter, which had not been consolidated by passing through a perihelion. And hence, says the author, this last comet was but little more affected by a perihelion passage than a planet would have been.

*Additional Experiments on the Muriatic and Oxymuriatic Acids.* By William Henry, M.D. F.R.S. V.P. of the Lit. and Phil. Society, and Physician to the Infirmary, at Manchester. Read March 19, 1812. [*Phil. Trans.* 1812, p. 238.]

In consequence of the discussion which has lately taken place concerning the nature of these acids, the author has been induced to repeat, with more perfect apparatus than he formerly possessed, a part of those experiments of which he published an account in the Philosophical Transactions for 1800, and to add others tending to elucidate the same subject. Those experiments in general related to the *electrization* of muriatic acid gas; but there was also one experiment in which he endeavoured and supposed that he had succeeded in extracting water from it, by means of muriate of lime, as sensible heat was evolved as soon as the muriate of lime was brought into contact with the gas. But he has since found that the evolution of heat occurs only when the muriate of lime has attracted moisture either from the atmosphere or from the mercury through which it is passed; for then it condenses a portion of the acid gas.

In his present experiments on electrization, Dr. Henry confirms his former results with regard to the evolution of hydrogen by that means; and he observes, that when the electrization of muriatic acid gas is performed over mercury, the hydrogen evolved amounts to about one fifteenth of the original quantity of gas employed. There appears, however, to be a contraction of volume, in consequence of the absorption of a part of the acid to form calomel. When the hydrogen amounts

to the quantity which has been stated, nothing further is gained by continuation of the process.

When mercury is not present during the electrization, then a different result is obtained. The quantity of hydrogen is estimated by the author not to exceed one seventieth part of the gas employed. The gas does not appear to be changed in bulk; but a part of it is converted into oxymuriatic acid gas. When this gas amounts to a certain proportion of the mixture, the effect of the electricity will then be to re-unite it to the hydrogen, and form muriatic acid gas rather than to decompose it.

But when mercury is present, it removes the oxymuriatic acid as fast as it is formed; and then a larger proportion of hydrogen is evolved, till every nascent portion of oxymuriatic acid gas is so surrounded by hydrogen that it cannot attain to a state of actual extrication.

In support of this explanation, Dr. Henry mixed thirty measures of hydrogen with 400 of muriatic acid gas; and when this mixture was electrified over mercury, no effect was produced; the quantity of hydrogen was not increased; and it was evident that no oxymuriatic gas was evolved, as the surface of the mercury remained without the slightest tarnish.

When, on the contrary, the muriatic acid gas was mixed with oxygen, and electrified over mercury, then a diminution of bulk ensued, and the surface of the mercury became tarnished, as by the contact of oxymuriatic gas; and water was formed in drops, and deposited on the inner surface of the vessel, combined with a portion of the muriatic acid.

These results, says Dr. Henry, may be explained either according to the commonly received theory, or according to that adopted by Mr. Davy.

According to one view the oxygen unites to the real acid of the muriatic gas, and forms oxymuriatic gas, which then deposits water that had been previously held in solution. According to the other, the oxygen unites with the hydrogen, and forms water, while the oxymuriatic base is now disengaged as a simple body.

The author, at present, is not acquainted with any ground for giving a preference to one above the other of these two modes of explanation; but he imagines that something would probably be gained by a precise determination of the proportions in which the gases saturate each other. He has not, however, been able to satisfy himself on this point; and he conceives that the condensation of a portion of the muriatic acid gas by the water that is formed during the process, is an almost insuperable impediment to any precise determination of these proportions.